(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 December 2005 (22.12.2005)

PCT

(10) International Publication Number
WO 2005/120265 A1

(51) International Patent Classification[7]: A42B 3/32

(21) International Application Number:
PCT/NZ2005/000108

(22) International Filing Date: 1 June 2005 (01.06.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
533492 9 June 2004 (09.06.2004) NZ
539587 20 April 2005 (20.04.2005) NZ

(71) Applicant *(for all designated States except US)*: **PACIFIC HELMETS (NZ) LIMITED** [NZ/NZ]; 315 Heads Road, Wanganui (NZ).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **BENNETT, David Winstone Aitken** [NZ/NZ]; 21 Sandcroft Drive, Wanganui (NZ).

(74) Agents: **ADAMS, Matthew, D** et al.; A J Park, 6th Floor Huddart Parker Building, PO Box 949, Wellington 6015 (NZ).

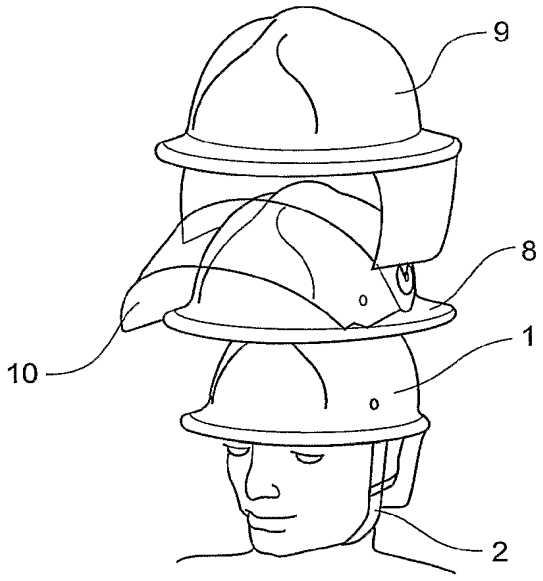
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PROTECTIVE HELMETS



(57) Abstract: A helmet system (e.g for firemen) where a base helmet which includes a Level 1 protective shell can be supplemented by the nested addition of one or more shells (Levels 2 onwards) thereby to upgrade protection and/or functionality. The additional shell(s) can include deeper skirts, carry a visor and/or other capabilities.

WO 2005/120265 A1

PROTECTIVE HELMETS

TECHNICAL FIELD

This invention relates to protective helmets such as those used by firemen.

BACKGROUND

The nature of fire fighting and rescue operations is such that risks of injury and death to emergency service crews can vary from incident to incident. Currently helmets need to be interexchanged.

BRIEF DESCRIPTION OF THE INVENTION

This invention relates to a safety helmet system (in a preferred instance but not limited to a fire fighting/rescue helmet design) which incorporates multiple layers of key components and structures into one helmet in such a manner that from a basic level of head protection, other higher levels of protection can be added without first removing the basic level.

A modular head protection system of the present invention has been designed in such a way that layers of protection can be added in single or multiple configurations to provide levels of protection appropriate to changing environments.

By proper wearing of this helmet system, injuries likely to result from impacts (either from falling objects or falling over), sharp objects (penetration), flame and heat exposure, liquid or chemical splash, molten metals and other hot fluids, electrical discharges, electrocution, or radiation and UV are eliminated or at least substantially reduced. In particular, a major cause of head injury to emergency services crews arises from road accidents when the vehicles they are travelling in are involved in accidents. These are comparatively common events as fire appliances and ambulances are large heavy vehicles and when travelling at speed to attend a call out, are vulnerable to over-turning and collisions. All the

evidence is that personnel in these vehicles should be wearing a light protective safety helmet.

Until now, many of the individual and separate items of safety equipment used by fire and rescue workers for different levels of risk have been developed as individual products, designed and manufactured to different Standards and performing to different physical tests. In some instances these individual and unrelated international safety Standards are increasingly becoming more closely related, but until now have required separate safety helmets to comply with the technical requirements of each Standard.

This invention in preferred forms provides a level of head protection, which not only integrates what previously was a multitude of helmets designed for different types of threats, but also widens the range of risks for which protection is provided.

The development of fire and rescue crew safety equipment has frequently been both uncoordinated and subject to the specialties and product whims of individual manufacturers. The result has been that as new technology tools arrive in the market place, these have simply been added to the list of equipment physically worn by the crews, adding weight and complexity to the fire or rescue environment. Furthermore, many of these devices were never designed to be fully compatible with each other, resulting in interface problems, duplication of function and unnecessary weight.

One intention of this design is to provide for the incorporation of a range of safety equipment used by fire and rescue workers into one integrated design, which avoids duplication while ensuring a complete lightweight safety helmet.

In addition, this invention adds new features, technologies and designs for some sub-components, and, by using a series of laminated semi-rigid materials, a lower specification safety helmets can be metamorphosised into a higher-level helmet with obsolescing any the basic components.

In another aspect the present invention consists in **a protective helmet assembly** having a protective shell (1) with a head cradle system as wearable head support therefor (2, 7), the assembly *being characterised in that* said protective shell (1) as a Level 1 shell is enhanced by at least one additional shell (8, 9) carried directly or indirectly thereby.

Preferably a Level 2 shell (8) as a said additional shell, is at least in nests or detachably nests the Level 1 shell.

Preferably said Level 2 shell (8) is more expansive than that of the Level 1 shell (1). Preferably the Level 2 shell is more expansive in skirting (11) down alongside and/or behind the head of a wearer.

Optionally the Level 2 shall (8) at least in part nests or detachably nests a Level 3 shell (9).

Preferably there is a visor (10) carried by the Level 2 shell (8) or between the Level 1 and Level 2 shells (1, 8) or between Level 2 and 3 shells.

Optionally the shells have a fireman's comb or central ridge as a design feature.

In another aspect the present invention consists in a **multi-purpose fire/rescue/or other protective helmet** incorporating a single shell to which can be added at least one additional shell or additional shells for higher level or higher levels of protection.

This first shell is referred to hereafter as the basic Level 1 shell.

In another aspect the present invention consists in, **in combination or as a kit**,

(a) a helmet ("Level 1 helmet") securable to the head of an intended user thereby to provide with its shell or equivalent at least some measure of impact protection to such user, and at least:

(b) a helmet component ("Level 2 component") to be associated with the Level 1 helmet thereby to provide

(i) enhanced impact protection to said intended user beyond that of the Level 1 helmet alone, and/or

(ii) a more downwardly depending skirt than any of the Level 1 helmet, and/or

(iii) a visor for said intended user.

In another aspect the present invention consists in, **in combination or as a kit,**

(a) a helmet ("Level 1 helmet") securable to the head of an intended user thereby to provide with its shell or equivalent at least some measure of impact protection to such user, and at least:

(b) a helmet component ("Level 2 component") to be associated with the Level 1 helmet thereby to provide

(i) enhanced impact protection to said intended user beyond that of the Level 1 helmet alone, and/or

(ii) a more downwardly depending skirt than any of the Level 1 helmet, and/or

(iii) the said skirt will extend downwards at least on both sides of the helmet, or perhaps cover the entire Level 1 shell, and/or

(iv) a skirt or skirts that extend down both sides of the Level 1 shell, connected from one side to the other by a section of the Level 2 shell (e.g. just extending around the lower extremities and below if necessary - Refer Fig.9), and/or

(v) a face shield/visor/eye protector for said intended user, and/or

(vi) a face shield/visor/eye protector that attach to the Level 2 shell rather than to the Level 1 helmet, being affixed to the Level 2 shell either internally (between the Level 1 and 2 shells) or externally on the outside of the Level 2 shell (e.g. see Refer Fig. 10).

In a preferred form of the invention skirt or skirts of the Level 2 helmet will normally extend downwards at least on both sides of the helmet, or perhaps cover the entire Level 1 shell. Alternatively, the said skirt or skirts may extend down both sides of the Level 1 shell, and be connected from one side to the other

by a section of the Level 2 shell just extending around the lower extremities (and below if necessary). Refer Fig.9.

In a preferred form the Level 2 helmet has a face shield/visor/eye protector for said intended user that attach to the Level 2 shell rather than to a Level 1 helmet. These items of face and eye protection may be affixed to the Level 2 shell either internally (between the Level 1 and 2 shells) or externally on the outside of the Level 2 shell (Refer Fig. 10).

Preferably there is a Level 3 component to be associated with the Level 1 helmet and the Level 2 component. Alternatively, there could be several of different Level 2 component versions each with features providing different or different mixes of capabilities.

The traditional design shapes and wearing position (on the head) of fire and other helmets for emergency services have, over the last century, exhibited great changes, but two primary distinctive characteristics have remained. These are the traditional comb line across and down the centre of the upper shell, and the fact that helmets have generally only covered the area of the wearers head above the reference plane line (i.e. approximately the ear opening) but also excluding the face.

This new design need not be limited to one particular shape of helmet or its styling or the area of head protected. Incorporated in the basic Level 1 shell is that component or are those components that permit the basic helmet to be retained on the wearer's head (i.e. chin strap, cradle system, headband, size adjustment system, etc.). These features can be all considered as "wearable head support" for the Level 1 shell or helmet. In addition, fitted to this shell is or can be a special energy absorbing liner that provides impact, penetration, thermal and radiation protection greater and over a wider area than impact cradles or ribbon systems. This impact protection is especially valuable in vehicle accidents and falling from heights.

The Level 1 helmet is preferably designed to provide protection for those types of rescue and fire fighting commonly known as bushfire, RTA (road transport accident), USAR (urban search and rescue/ civilian rescue operations) MEDIVAC (medical rescue and evacuations) etc, where the risk of serious impacts or high risk fire and/or thermal threats are relatively low. To these common low level fire and rescue threats, the helmet preferably specifically adds protection from head injuries in the event of accidents involving emergency services vehicles.

Because this Level 1 helmet is designed to fit with at least one other and preferably a multiplicity of additional protective levels, it is possible that some of the optional components that might normally be attached to this type of helmet, will become absorbed within the higher levels or impediments to the attachment of higher levels of protection. These optional components could include helmet mounted hands- free torches, face shields, reflective markings and other accessories.

Where necessary, provision needs to be made to attach some of these optional components either internally in the Level 1 helmets, or to replicate their function in the Level 2 or higher Level components.

Because the Level 1 helmet provides only a basic level protection, the addition of a second shell with further energy and penetration resistance is necessary for most types of structural fire fighting, military fire and rescue and other high risk rescue operations.

Normally safety helmets designed for these operations are separate helmets. The specific feature of this design is the fact that the Level 1 helmet can be upgraded momentarily by the addition of the Level 2 shell. The Level 2 shell and impact system is specifically designed to be used and fitted to the Level 1 helmet, and cannot normally provide designed levels of protection to the wearer without combination with the Level 1 helmet.

Previously, a structural fire helmet or similar helmets used by other emergency services have required that the design of the helmet be specifically intended for this purpose. This claim specifically relates to a design of helmet with a plurality of both shell and impact/thermal protection system, designed in a modular fashion where the addition of levels of protection are built upon each other with the need to discard or remove the first level of helmets before wearing the second or subsequent levels. Such additional items of protection may be described as additional Levels or clipped-on components that supplement the original base helmet.

Dependent upon the requirements of the Standard, and the operational requirements of the Service itself, attachments and other components can be provided including the Level 2 shell to provide face protection (face shields etc.) lighting, (hands-free torch or flash-light), rank markings, reflective trims etc.

The addition of further levels of protection is dependant on the circumstances of the emergency call-out. Once again, the principle is that additional protection can be added to the basic helmet without the requirement to discard earlier protective components. Not only is the wearer able to retain the lower levels of helmet on their head at all times, but the additional levels of protection can be selected or even discarded as the scene changes or evolves.

These third and subsequent levels of protection principally come about by the need for extremely high temperature fire fighting, or chemical or biological threats. Not infrequently, these risks are associated with training for these types of events, and the third and subsequent materials are destroyed, but the Level 1 and Level 2 components are protected from unnecessary damage.

In a further aspect the present invention therefore consists in **a Level 1 shell helmet** suitable for use in a combination or a kit of the present invention.

In still a further aspect the invention is **a Level 2 component for association with a Level 1 shell helmet**, said Level 2 component and/or Level 1

shell helmet being substantially as herein described with or without reference to any one or more of the accompanying drawings.

In yet a further aspect the present invention consists in **a Level 3 component** for association with both a Level 1 shell helmet and Level 2 component of the present invention, any aspect being substantially as herein described with reference to any one or more of the accompanying drawings.

In yet a further aspect the present invention consists in **a helmet system** enabling tuning, by choice of component association (directly or indirectly) with a base helmet, the level of protection to be afforded.

Preferably at least one component is a Level 1 shell helmet in accordance with the present invention.

Preferably a further component is a Level 2 component in accordance with the present invention.

Preferably a further component is a Level 3 component in accordance with the present invention.

In yet a further aspect the present invention consists in **the use of a helmet assembly, a helmet system or helmet components or a combination or kit** of the present invention so as to provide for different levels of protection.

As used herein the term "and/or" means "and" or "or", or both.

As used herein the term "(s)" following a noun includes, as might be appropriate, the singular or plural forms of that noun.

As used herein the term "shield/visor/eye protector" includes any form of protection preferably still allowing vision.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred form of the present invention will now be described with reference to the accompanying drawings in which

Figure 1 shows as an exploded view a user wearing a Level 1 shell component helmet of an Australian/New Zealand/North American-USA type in accordance with the present invention and having (in exploded view)

sequentially thereover a Level 2 shell component and thereover a Level 3 shell component, the Level 2 component being shown with a visor whilst the Level 3 component is shown with expansive shroud,

Figure 2 shows the Level 1 shell helmet in use,

Figure 3 shows the combination of the assembly of the Level 1 shell helmet of Figure 2 in use with the Level 2 component,

Figure 4 shows the use of all of the components as an assembly as shown in Figure 1, Level 3 component nesting on the Level 2 component in turn which nests on the Level 1 shell helmet,

Figures 5 through 8 correspond to those of Figures 1 through 4 but in respect of European style helmet assembly as opposed to that depicted in Figures 1 through 4 more appropriate for use in New Zealand, Australia, and North American-USA,

Figure 9 shows the design of a Level 2 shell whereby the said skirts extend downwards at the sides of the Level 1 helmets, may be joined and connected by the lower ring of the Level 2 shell extending around the brim of the Level 1 shell, in this instance rearwards, (but not exclusively) wherein the ring could extend either forward or backwards, or both,

Figure 10 shows the affixing of a face shield/eye protector/visor accessories in such a way that the means of securing and hinging/rotating these components is by way of attachment to the Level 2 shell, and

Figure 11 shows Level 2 shell of Figures 9 and 10 from below showing the visor engaged thereto so as to guidably be pivoted therefrom and able to assume a number of pull down positions.

DETAILED DESCRIPTION OF THE INVENTION

In the preferred form of the present invention the design considerations taken into account have been those previously discussed.

Turning specifically to Figure 2 it can be seen that a first shell 1 (e.g. of a composite reinforced with fibreglass or Aramid materials or alternatively plastic

injected external materials) is supported on a head cradle system (as a wearable support for the shell 1) which includes a size adjustment and impact protection materials. This is held to the wearer's face by appropriate harness and chin strap arrangements 2, etc. The shell 1 carries a unitary or fabricated skirt extension 11.

Figure 3 shows a Level 2 shell 8 with visor 10 preferably detachably nesting over part of the Level 1 shell 1. Figure 4 shows a Level 3 shell 9 with still more expansive skirts 12 nesting over the Level 2 shell 8.

Figures 9 to 11 show a level 2 shell 3 with a visor 4 pivoted at 5 and guided by the friction slide arrangement 6. The arrangement is as previously described.

Any appropriate engagement (preferably not requiring tools) can be used to hold components in any desired nested arrangement (e.g. spring loaded clipping) so as not to allow dislodging without real effort. Whilst the different levels preferably serially nest, any appropriate retention interengagement can be used to provide detachable nesting. This includes one or more of toggle, VELCRO, clip fit and other interengagements.

CLAIMS:

1. **A protective helmet assembly** having a protective shell (1) with a head cradle system as wearable head support therefor (2, 7), the assembly *being characterised in that* said protective shell (1) as a Level 1 shell is enhanced by at least one additional shell (8, 9) carried directly or indirectly thereby.

2. An assembly of claim 1 wherein a Level 2 shell (8) as a said additional shell, is at least in nests or detachably nests the Level 1 shell.

3. An assembly of claim 1 or 2 wherein said Level 2 shell (8) is more expansive than that of the Level 1 shell (1).

4. An assembly of claim 3 wherein the Level 2 shell is more expansive in skirting (11) down alongside and/or behind the head of a wearer.

5. An assembly of claim 4 wherein the Level 2 shall (8) at least in part nests or detachably nests a Level 3 shell (9).

6. An assembly of claim 3 or 4 wherein there is a visor (10) carried by the Level 2 shell (8) or between the Level 1 and Level 2 shells (1, 8) or between Level 2 and 3 shells.

7. An assembly of any one of claims 1 to 5 wherein the shells have a fireman's comb or central ridge as a design feature.

8. **In combination, or as a kit,**

(a) a helmet ("Level 1 helmet") securable to the head of an intended user thereby to provide with its shell or equivalent at least some measure of impact protection to such user, and at least:

(b) a helmet component ("Level 2 component") to be associated with the Level 1 thereby to provide

(i) enhanced impact protection to said intended user beyond that of the Level 1 helmet alone, and/or

(ii) a more downwardly depending skirt than any of the Level 1 shell, and/or

(iii) a visor for said intended user.

9. **In combination or as a kit,**

(a) a helmet ("Level 1 helmet") securable to the head of an intended user thereby to provide with its shell or equivalent ("Level 1 shell") at least some measure of impact protection to such user, and

(b) a helmet component ("Level 2 component") to be associated with the Level 1 helmet thereby to provide

(i) enhanced impact protection to said intended user beyond that of the Level 1 helmet alone, and/or

(ii) a more downwardly depending skirt than any of the Level 1 shell, and/or

(iii) a skirt that will extend downwards at least on both sides of the Level 1 helmet and/or cover, at least substantially, the entire Level 1 shell, and/or

(iv) a skirt or skirts that extend down both sides of the Level 1 shell, connected from one side to the other by part of the Level 2 component, and/or

(v) a face shield/visor/eye protector for said intended user,

and, optionally,

(c) a face shield/visor/eye protector that attach to the Level 2 component or its shell rather than to the Level 1 helmet.

10. A combination or kit of claim 8 or 9 wherein there is a Level 3 component to be associated directly or indirectly with the Level 1 helmet and the Level 2 component.

11. A combination or kit of claim 8 or 9 wherein there are at least two Level 2 component versions.

12. A **Level 1 shell helmet** suitable for use in a combination or a kit of any one of claims 8 to 11.

13. A **Level 2 component for association with a Level 1 helmet**, said Level 2 component and/or Level 1 helmet being substantially as herein described with or without reference to any one or more of the accompanying drawings.

14. A **Level 3 component** for association directly or indirectly with both a Level 1 helmet and Level 2 component of any one of claims 8 to 11, any aspect being substantially as herein described with reference to any one or more of the accompanying drawings.

15. A **protective helmet** having a protective shell (the "Level 1 helmet") adapted to be worn and adapted to nest at least in part within one or more additional shells ("Level 2", "Level 3", etc. shells) for a higher level or higher levels of protection.

16. A **helmet system** enabling tuning, by choice of component association (directly or indirectly) with a base helmet, the level of protection to be afforded.

17. **The use of a helmet system of claim 9 or helmet components of claim 6 or 7 or a combination or kit** of any one of claim 1 to 4 so as to provide for different levels of protection.

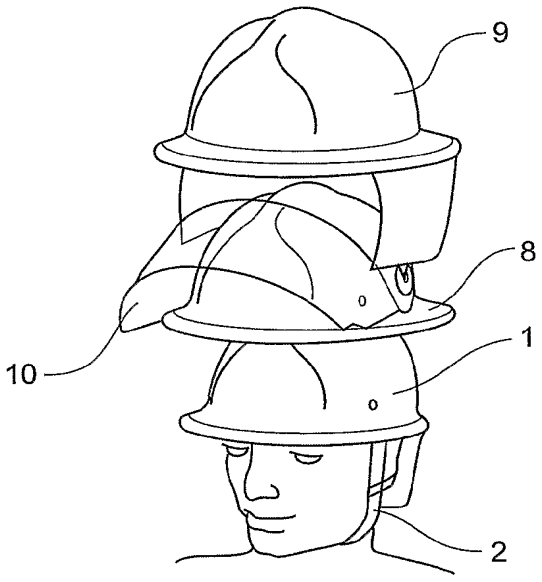


FIGURE 1

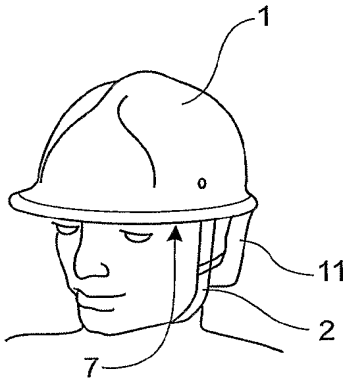


FIGURE 2

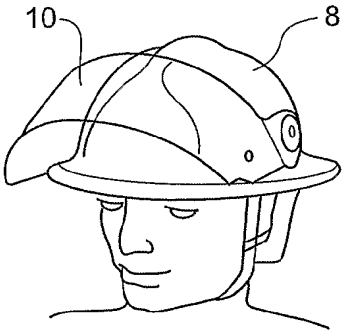


FIGURE 3

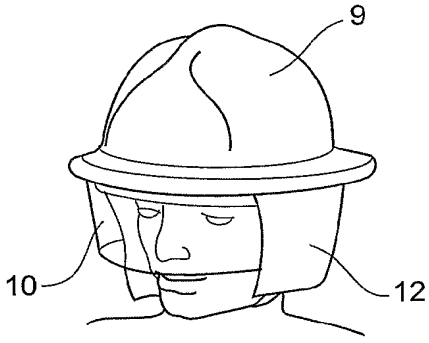


FIGURE 4

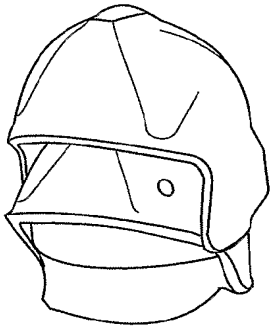


FIGURE 5

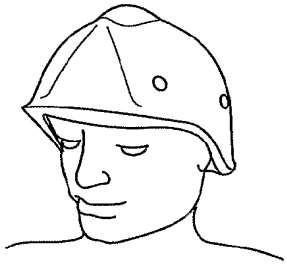


FIGURE 6

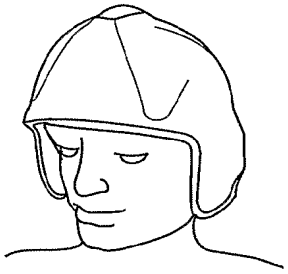


FIGURE 7

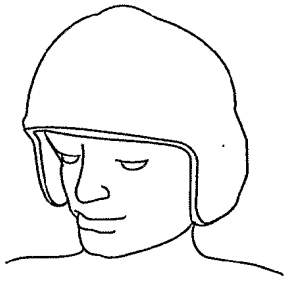


FIGURE 8

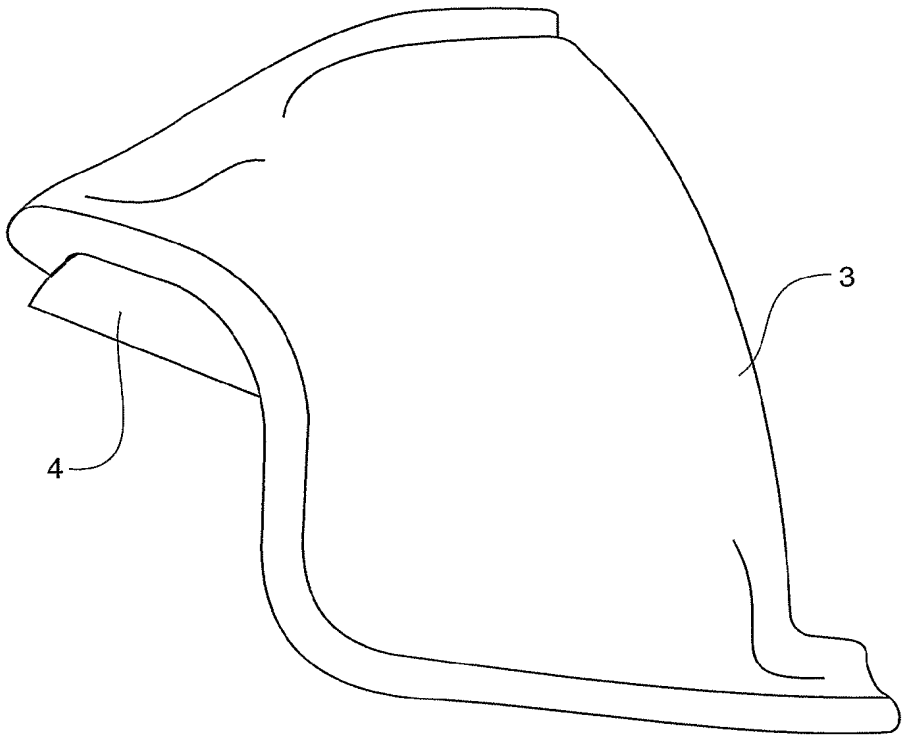


FIGURE 9

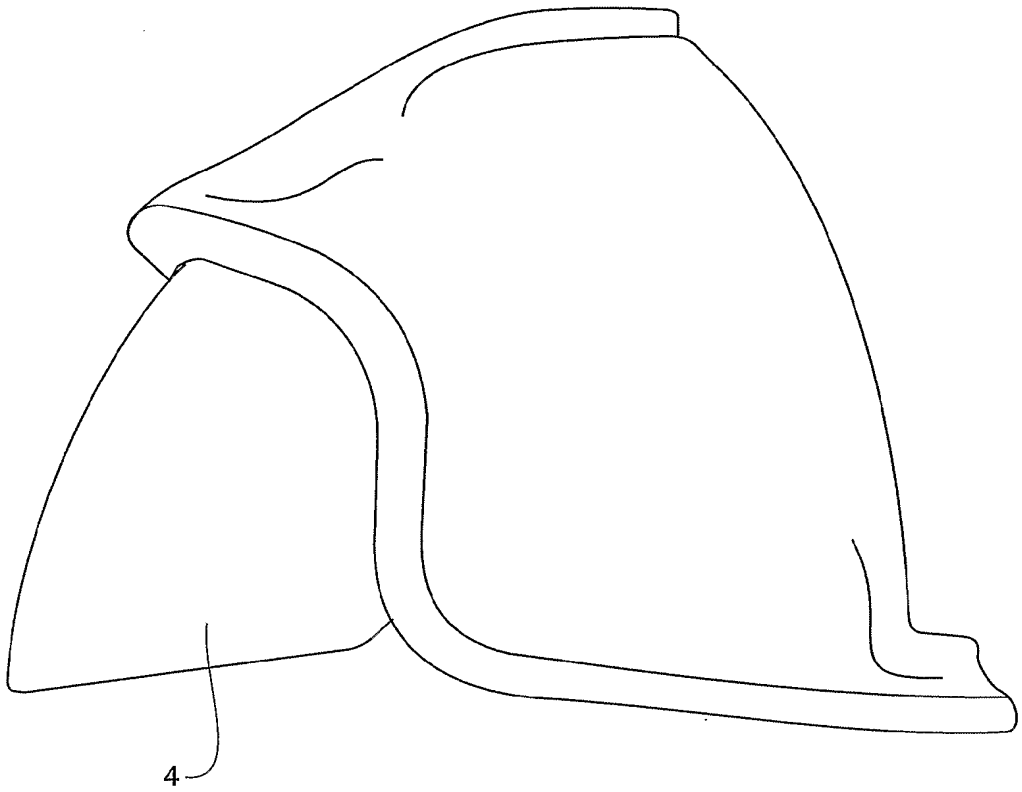


FIGURE 10

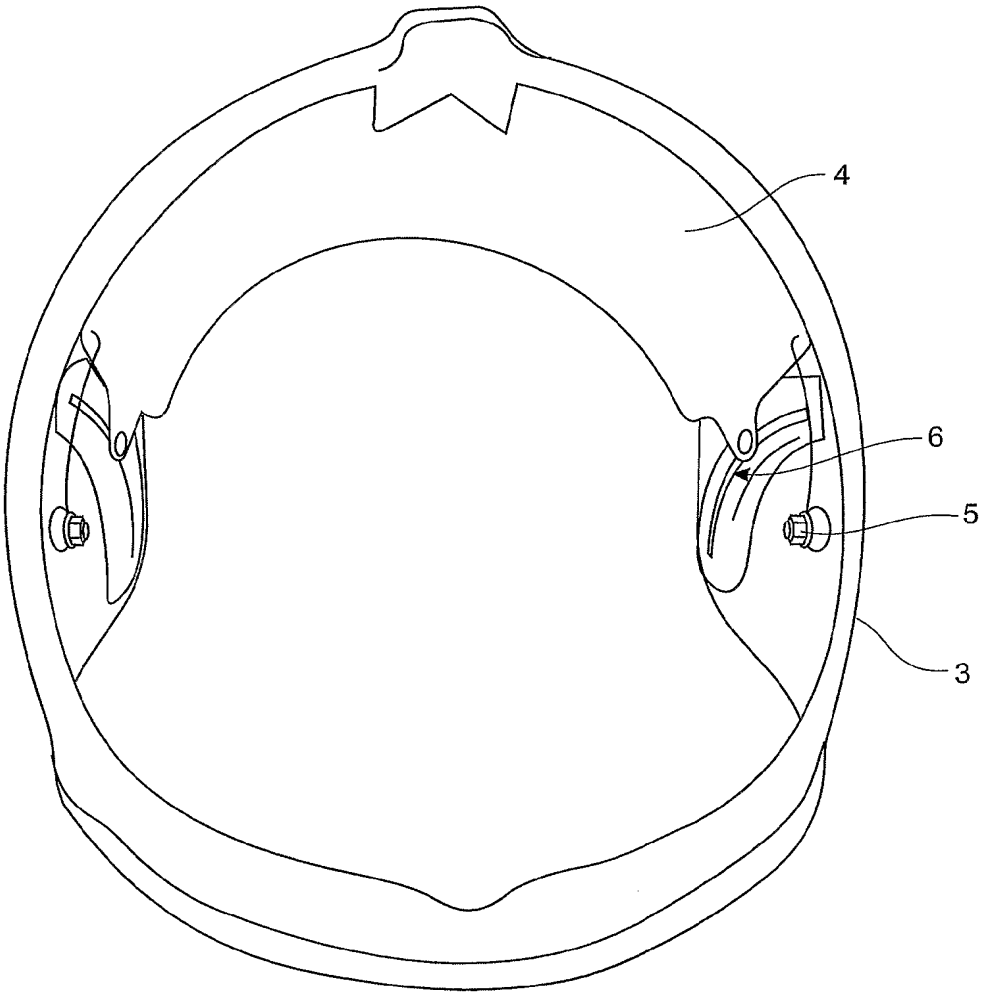


FIGURE 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NZ2005/000108

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: A42B 3/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DWPI A42B 3/04, 3/32, A42B 3/IC, A62B 18/IC, F41H 1/IC & Keywords (modular, skirt, visor, strength) & like terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 10028849 A1 (SCHUBERTH-WERK GMBH & CO KG) 20 December 2001 See especially figures, paragraphs 10 & 27	1-4, 7-17
X	US 5517691 A (BLAKE) 21 May 1996 Whole document	1-4, 6-17
X	US 6032297 A (BARTHOLD et al.) 7 March 2000 Whole document	1-3, 7-15
X	FR 2750299 A (SUIF FERNAND ALBERT) 2 January 1998 See especially figures, page 1, line 20-25, page 2, line 9-16	1-3, 6-15

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 August 2005	8 SEP 2005
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer **VENKAT IYER** Telephone No : (02) 6283 2144

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NZ2005/000108

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	GB 2387102 A (MODULAR HELMET SYSTEMS LIMITED) 8 October 2003 Whole document Especially figures, items 120, 160	8-14, 16-17
P, X	FR 2860400 A1 (INTERACTIVE SAFETY PROD INC) 8 April 2005 Whole document	1-4, 6-17

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/NZ2005/000108

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
DE	10028849	NONE					
US	5517691	NONE					
US	6032297	NONE					
FR	2750299	NONE					
GB	2387102	AU	2003214465	EP	1489937	US	2005060793
		WO	03086126				
FR	2860400	WO	2005034667 (English)				

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX